Rosemount™ 702 Wireless Discrete Transmitter
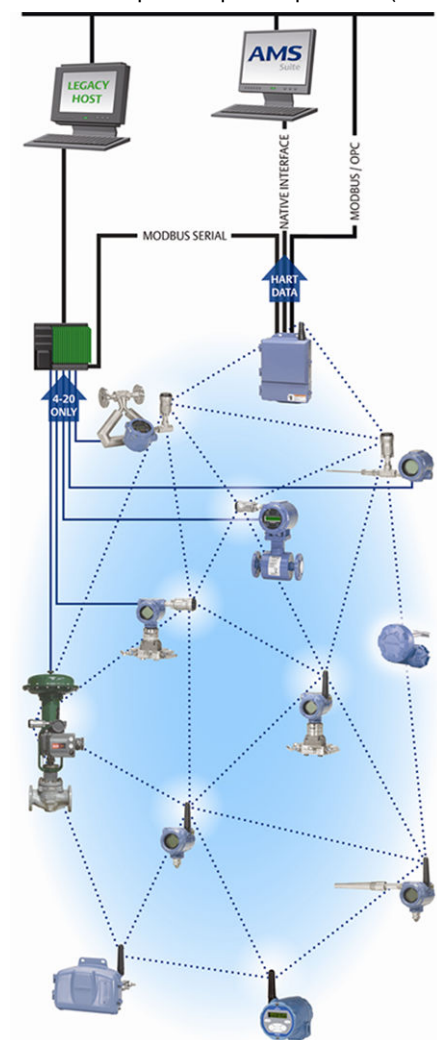
IEC CE **Wireless HART**

- An installation-ready solution that provides dual channel, discrete input, discrete output, or leak detection input options.
- Discrete single or dual switch input with logic for limit contact and opposing contact applications.
- Momentary inputs are continuously measured between wireless updates.
- Dual channels are each configurable for discrete input or discrete output.
- Self-organizing network delivers information rich data with >99 percent data reliability.

ROSEMOUNT™

EMERSON.™

Emerson™ Wireless Solutions

Reliable wireless architecture

- Standard IEEE 802.15.4 radios
- 2.4 GHz ISM band sliced into 15 radio channels
- Time synchronized channel hopping to avoid interference from other radios, Wi-Fi, and EMC sources and increase reliability.
- Direct sequence spread spectrum (DSSS) technology delivers high reliability in challenging radio environment.

Contents

Emerson.com/Rosemount

SmartPower™ solutions

- Optimized Emerson instrumentation, both hardware and software, to extend power module life
- Intrinsically safe power module allows field replacements without removing the transmitter from the process, keeping personnel safe, and reducing maintenance costs.

IEC 62591 (*Wireless*HART®)... the industry standard

Self-organizing, adaptive mesh routing

- No wireless expertise required, network automatically finds the best communication paths.
- The self-organizing, self-healing network manages multiple communication paths for any given device. If an obstruction is introduced into the network, data will continue to flow because the device already has other established paths. The network will then lay in more communication paths as needed for that device.

Ordering information

Specification and selection of product materials, options, or components must be made by the purchaser of the equipment. See *Material selection* for more information.

The starred offerings (★) represent the most common options and should be selected for best delivery. The non-starred offerings are subject to additional delivery lead time.

Table 1: Rosemount 702 Wireless Discrete Transmitter Ordering Information

Product description			
702	Discrete transmitter		★
Transmitter type			
D	Wireless field mount		★
Output			
X	Wireless		★
Measurement			
32	Discrete dual input (dry contact), detects momentary inputs and counts		★
42	Discrete dual input or output, configurable		★
52	Plunger arrival detection (for use with ETC Cyclops Plunger Arrival Sensor)		★
61[1]	Liquid hydrocarbon detection (for use with TraceTek® sensing cable)		★
Housing			
D	Dual compartment housing – aluminum		★
E	Dual compartment housing – SST		★
Conduit threads			
1	½ –14 NPT		★
Certifications		**Measurement option codes**	
I5	U.S.A. intrinsically safe, Non-incendive, and Dust ignition-proof	32, 52, 61	★
I6	Canada intrinsically safe	32, 52, 61	★
I1	ATEX intrinsically safe	32, 61	★

Table 1: Rosemount 702 Wireless Discrete Transmitter Ordering Information *(continued)*

IU	ATEX intrinsically safe for zone 2	32, 42	★
I7	IECEx intrinsically safe	32, 61	★
IY	IECEx intrinsically safe for zone 2	32, 42	★
I4	TIIS intrinsically safe	32	★
I3	China intrinsically safety	32	★
N5	U.S.A. division 2, Non-incendive	32, 42, 52	★
N6	Canada division 2, Non-incendive	32, 42, 52	★
NA	No approval	32, 42, 52, 61	★

Wireless options

Wireless update rate, operating frequency and protocol

WA3	User configurable update rate, 2.4 GHz DSSS, IEC 62591 (*Wireless*HART®)	★

Omni-directional wireless antenna and SmartPower Solutions[2]

WK1	External antenna, adapter for black power module (I.S. Power module sold separately)	★
WM1	Extended range, external antenna, adapter for black power module (I.S. Power module sold separately)	★
WJ1	Remote antenna, adapter for black power module (I.S. Power module sold separately)	
WN1[3]	High-gain, remote antenna, adapter for black power module (I.S. Power module sold separately)	

Other options (include with selected model number)

Extended product warranty

WR3	3-year limited warranty	★
WR5	5-year limited warranty	★

Display[1]

M5	LCD display	★

Mounting bracket

B4	Universal L mounting bracket for two inch pipe mounting – SST bracket and bolts	★

Configuration

C1	Factory configure date, descriptor, message fields, and wireless parameters	★

Cable gland

G2	Cable gland (7.5–11.9 mm)	★
G4[4]	Thin wire cable gland (3–8 mm)	★

Switches and kits

SS01	Universal safety shower/eyewash kit with UL switches	★
SS02	Universal safety shower/eyewash kit for insulated pipe with UL switches	★
SS03	Universal safety shower/eyewash kit with CSA switches	★
SS04	Universal safety shower/eyewash kit for insulated pipe with CSA switches	★

Typical model number: 702 D X 22 D 1 NA WA3 WK1 M5

(1) *LCD display not available for option code 61.*

(2) *Black power module must be shipped separately, order Model 701PBKKF or Part number 00753-9220-0001.*

(3)   Limited availability, consult factory for details.
(4)   Thin wire cable gland is preferred for measurement option 61.

Table 2: Spare Parts and Accessories

Part number	Description
00702-9010-0001	Universal safety shower/eyewash kit with UL switches
00702-9010-0002	Universal safety shower/eyewash kit for insulated pipe with UL switches
00702-9010-0003	Universal safety shower/eyewash kit with CSA switches
00702-9010-0004	Universal safety shower/eyewash kit for insulated pipe with CSA switches

Safety shower and eye wash monitoring

The Rosemount 702 Transmitter can be used to monitor safety showers and eye wash stations by using switch kits provided by TopWorx™, an Emerson company. These kits are ordered as a part of the Rosemount 702 model code and are available for both insulated and un-insulated pipes. These kits contain the switches, brackets and cables that are necessary to install the transmitter to monitor both the safety shower and the eye wash in a single station. Because each has two input channels, one transmitter can be used to monitor both a safety shower and an eye wash.

Each safety shower monitoring kit contains:
- Two TopWorx GO™ Switch magnetic proximity switches
- Two cables, six-foot and 12-foot
- Two black polymer cable glands
- Mounting kit for safety shower and eye wash

UL and CSA switches

Safety shower and eye wash monitoring kits are available with either UL or CSA switches. This designation refers to the ordinary location certification of the GO Switch in the kit. These are not hazardous locations certificates. The Go Switch is regarded as a simple apparatus and does not require its own hazardous locations certificate. Either GO Switch is suitable for installation in hazardous locations when wired to the Rosemount 702 with an appropriate hazardous locations certificate. The CSA GO Switch is for applications in Canada, the UL GO Switch is for applications in all other world areas.

Installation drawings and instructions

Installation drawings and instructions for safety shower and eye wash kits are included in the Rosemount 702 Transmitter *Reference Manual*. This manual can be downloaded at the Rosemount 702 Transmitter *Product Page*.

Safety shower monitoring

When the shower valve is activated (valve open) by pulling down on the handle, the TopWorx switch is activated (closed switch) and the Rosemount 702 senses that switch closure. This switch state is then transmitted by the transmitter to the Gateway, which then sends that information to the control host or alert system. When the shower valve is closed, the switch remains in the activated state until it is reset by a technician. The switch can be re-set only by placing a ferrous metal object on the far side of the sensing area of the switch.

Figure 1: TopWorx Switch Installed on a Safety Shower

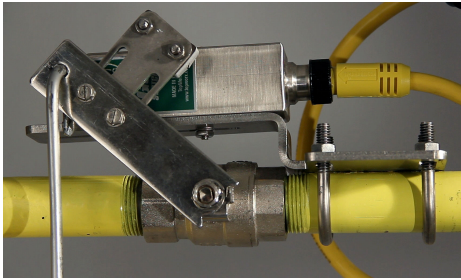**Figure 2: Detail of Switch Installation on Safety Shower**

Figure 3: Safety Shower Valve in Activated Position

Eye wash monitoring

When the eye wash valve is activated (valve open) by pushing down on the hand paddle, the TopWorx switch is activated (closed switch) and the Rosemount 702 senses that switch closure. This switch state is then transmitted by the transmitter to the Gateway, which then sends that information to the control host or alert system. When the eye wash valve is closed, the switch remains in the activated state until it is reset by a technician. The switch can be re-set only by placing a ferrous metal object on the far side of the sensing area of the switch.

Figure 4: TopWorx Switch Installed on an Eye Wash Station

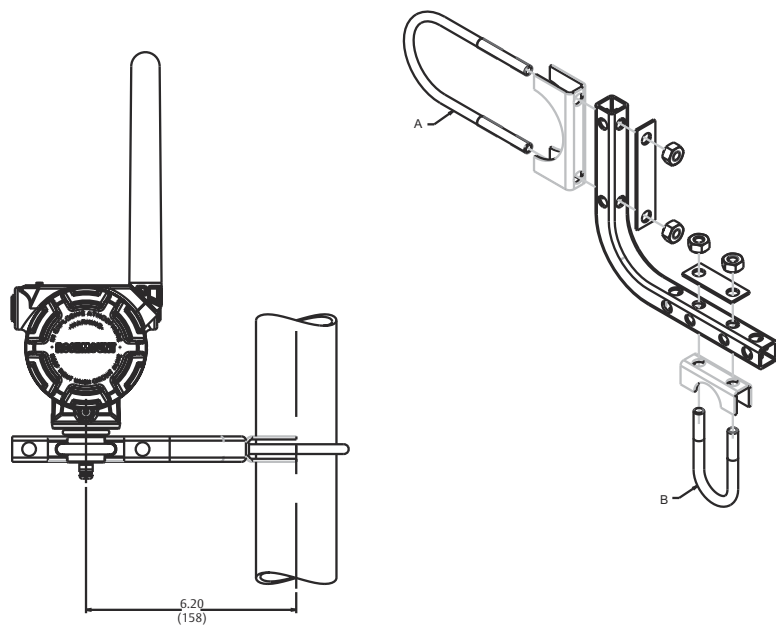**Figure 5: Eye Wash in Activated Position**

Dimensional drawings

Figure 6: Rosemount 702 Transmitter

A

90°

11.16
[284]

4.20
[107]

3.61
[92]

12.39
[315]

5.51
[140]

6.71
[170]

6.05
[154]
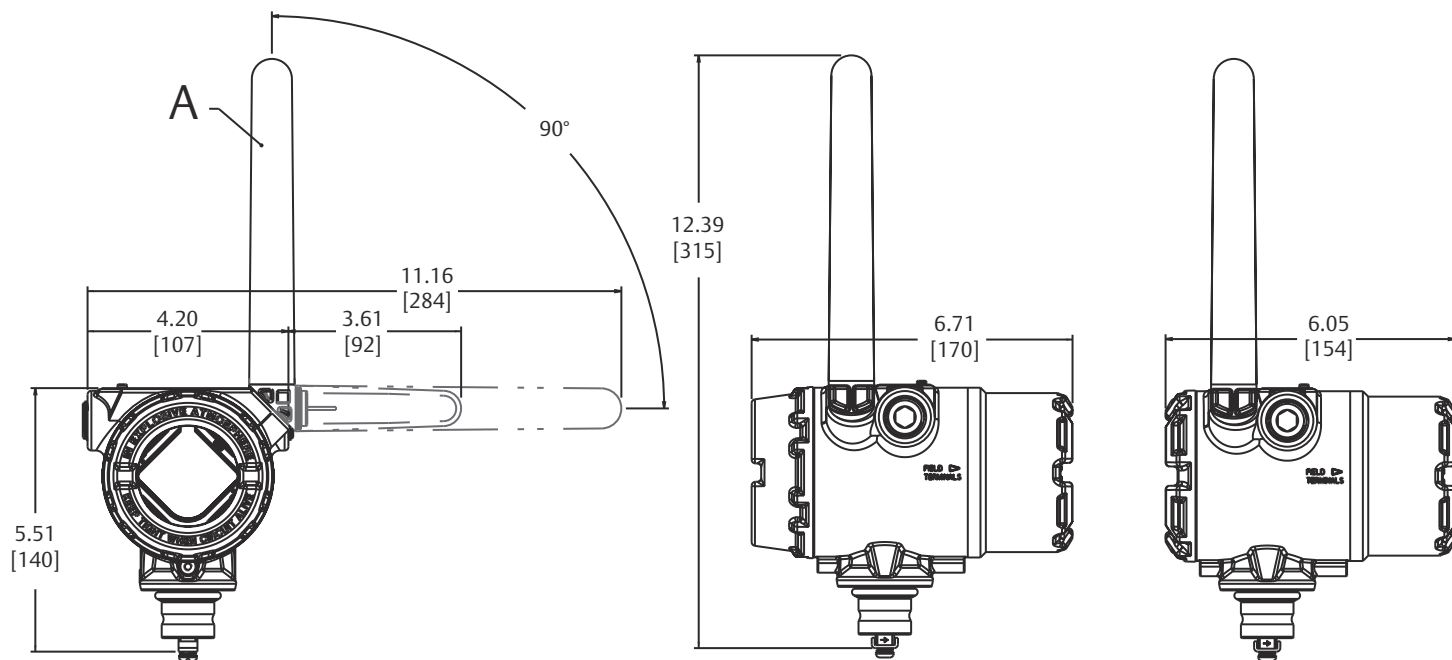
A. Extended range external antenna

Dimensions are in inches (millimeters).

Figure 7: Rosemount 702 Transmitter Mounting Configurations with Optional Mounting Bracket
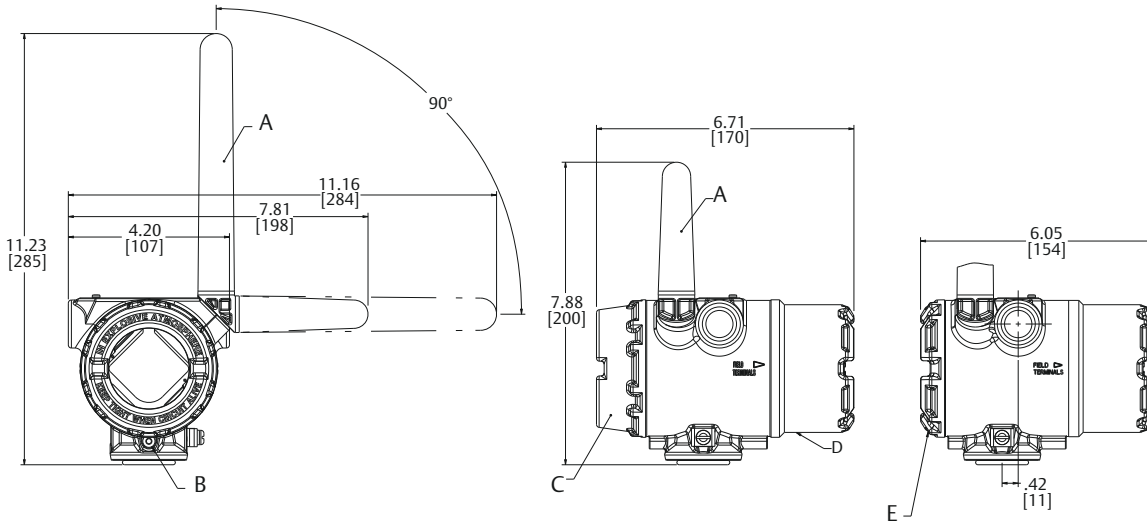
A

B

6.20
(158)

A. 2-in. U-bolt for pipe mounting

B. 1-in. U-bolt for transmitter mounting

Dimensions are in inches (millimeters).

Figure 8: Rosemount 702 Wireless Transmitter

A. 2.4 GHz/*Wireless*HART® extended range antenna

B. Ground screw assembly

C. Digital display cover

D. Field terminals

E. Transmitter electronics

Dimensions are in inches (millimeters).

Figure 9: Rosemount 702 Wireless Transmitter Mounting Configuration with Optional Mounting Bracket
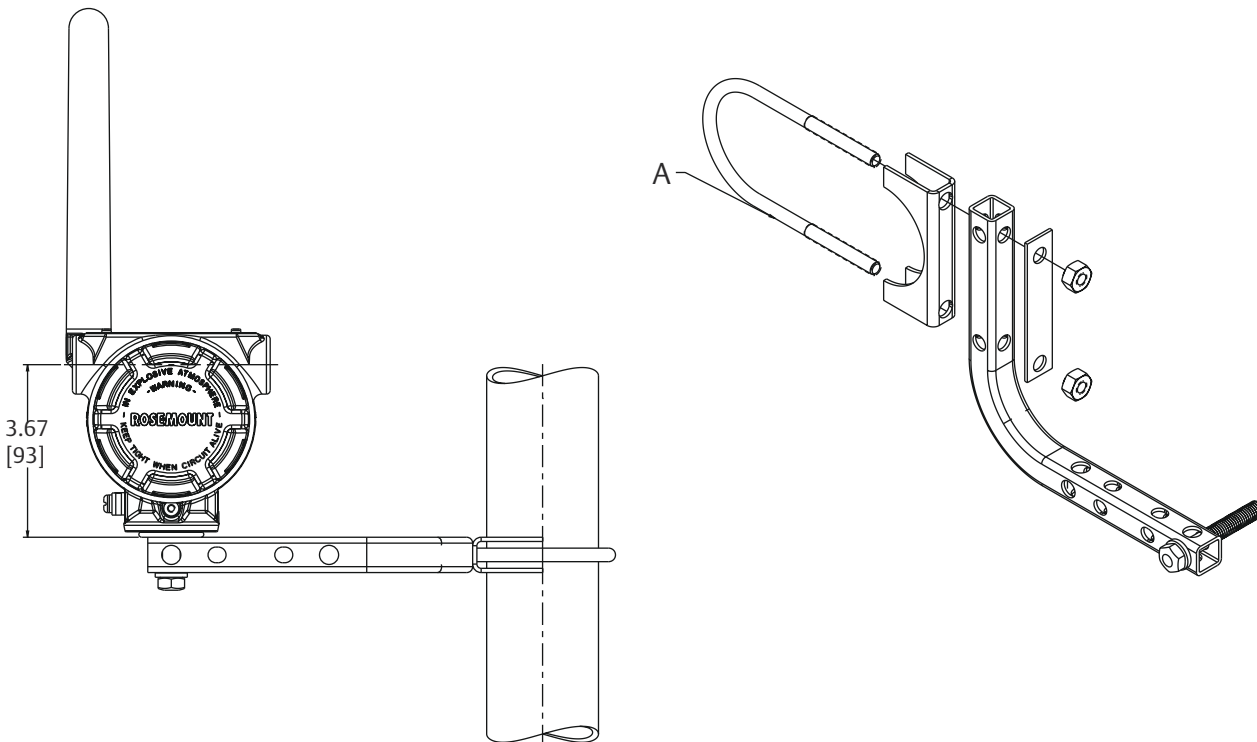
A. 2-in. U-bolt for pipe fitting

Dimensions are in inches (millimeters).

Specifications

Functional specifications

Discrete input

Single or dual SPST dry contacts, single SPDT dry contacts or leak detection. To maintain I.S. ratings, contacts must be limited to simple switches or leak detection only.

Switching threshold, measurement option code 32 and 42

Open > 100 K Ohm

Closed < 5 K Ohm

Momentary discrete input, measurement option code 32 and 42

Detects momentary discrete inputs of 10 millisecond or more duration. At each wireless update, device reports current discrete state and accumulating count of close-open cycles. Accumulating count registers from 0 to 999,999, then re-sets to zero.

Discrete output, measurement option Code 42

Maximum rating: 26 Vdc, 100 mA

On resistance: typical 1 Ohm

Wireless output

IEC 62591 (*Wireless*HART®) 2.4 GHz DSSS

Radio frequency power output from antenna

External (WK option) antenna: Maximum of 10 mW (10 dBm) EIRP

Extended range, external (WM option) antenna: Maximum of 18 mW (12.5 dBm) EIRP

Remote (WJ option) antenna: Maximum of 17 mW (12.3 dBm) EIRP

High-gain, remote (WN option) antenna: Maximum of 40 mW (16 dBm) EIRP

Local display

The optional integral LCD display can show discrete state and diagnostic information. Display updates at each wireless update.

Note
The option for a local display is not available with option 61, Liquid hydrocarbon leak detection.

Humidity limits

0–100 percent relative humidity

Wireless update rate, measurement option code 32, 42, 52

User selectable, 1 sec. to 60 min.

Wireless update rate, measurement option code 61

User selectable, four seconds to 60 minutes

Wireless latching time, measurement option code 52

User selectable 1 sec. to 10 min.

Physical specifications

Material selection

Emerson provides a variety of Rosemount products with various product options and configurations including materials of construction that can be expected to perform well in a wide range of applications. The Rosemount product information presented is intended as a guide for the purchaser to make an appropriate selection for the application. It is the purchaser's sole responsibility to make a careful analysis of all process parameters (such as all chemical components, temperature, pressure, flow rate, abrasives, contaminants, etc.), when specifying product, materials, options and components for the particular application. Emerson is not in a position to evaluate or guarantee the compatibility of the process fluid or other process parameters with the product, options, configuration or materials of construction selected.

Wireless power module electrical connections

Replaceable, Intrinsically Safe Lithium-Thionyl Chloride power module with PBT polymer enclosure. Ten year life at one minute update rate.

Note

Reference conditions are 70 °F (21 °C), and routing data for three additional network devices.

Note

Continuous exposure to ambient temperature limits -40 °F or 185 °F (-40 °C or 85 °C) may reduce specified power module life by less than 20 percent.

Switch terminals

Screw terminals permanently fixed to terminal block

Field Communicator terminal connections

Clips permanently fixed to terminal block

Materials of construction

Enclosure

Housing: low-copper aluminum, or stainless steel

Paint: Polyurethane

Cover O-ring: Buna-N

Terminal block and power module pack

PBT

Antenna

PBT/PC integrated omni-directional antenna

Conduit entries

½–14 NPT

Weight

Low-copper aluminum

Rosemount 702 without LCD display - 4.6 lb (2.0 kg)

Rosemount 702 with M5 LCD display - 4.7 lb (2.1 kg)

Stainless steel

Rosemount 702 without LCD display - 8.0 lb (3.6 kg)

Rosemount 702 with M5 LCD display - 8.1 lb (3.7 kg

Enclosure ratings

NEMA® 4X and IP66/67

Mounting

Transmitters may be attached directly to switch, brackets also permit remote mounting. See *Dimensional drawings* for more information.

Performance specifications

Electromagnetic compatibility (EMC)

Meets all industrial environment requirements of EN61326 and NAMUR NE-21. Maximum deviation <1% span during EMC disturbance.[1]

Vibration effect

Wireless output unaffected when tested per the requirements of IEC60770-1 field or pipeline with high vibration level (10–60 Hz 0.21 mm displacement peak amplitude/60–2000 Hz 3 g).

Wireless output unaffected when tested per the requirements of IEC60770-1 field with general application or pipeline with low vibration level (10–60 Hz 0.15 mm displacement peak amplitude/60–500 Hz 2 g).

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(1)   *During surge event device may exceed maximum EMC deviation limit or reset; however, device will self-recover and return to normal operation within specified start-up time.*

Temperature limits

Description	Operating limit	Storage limit
Without LCD display	-40 to 185 °F	-40 to 185 °F
	-40 to 85 °C	-40 to 85 °C
With LCD display	-4 to 175 °F	-40 to 185 °F
	-20 to 80 °C	-40 to 85 °C

Wireless output specifications

Terminal block connections

The Rosemount 702 has a pair of screw terminals for each of two channels, and a pair of communication terminals. These terminals are labeled as follows:

- CH1+: Channel one positive
- CMN: Common
- CH2+: Channel two positive
- CMN: Common
- COMM: Communication terminals
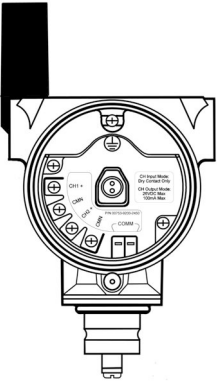
Dry contact switch inputs, measurement option code 32, and 42

Terminal block connections

The Rosemount 702 has a pair of screw terminals for each of two channels, and a pair of communication terminals. These terminals are labeled as follows:

- CH1+: Channel one positive
- CMN: Common
- CH2+: Channel two positive
- CMN: Common
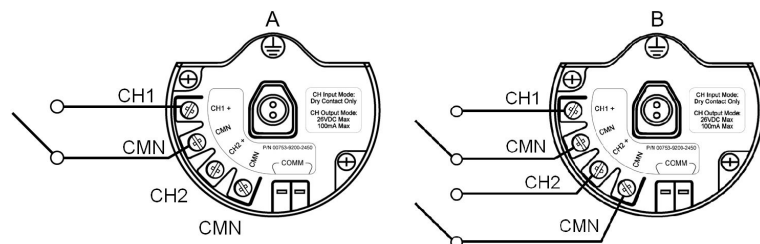- COMM: Communication terminals
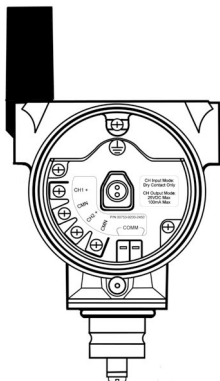
Single input or dual input independent

The Rosemount 702 will accept the input from one or two single pole single throw switches on inputs CH1 and CH2. The wireless output of the transmitter will be both a primary variable (PV) and a secondary variable (SV). The PV is determined by the CH1 input. The SV is determined by the CH2 input. A closed switch drives a TRUE output. An Open switch drives a FALSE output.

Note
Any dry contact input can be inverted by the device, so as to give the opposite effect. This is useful, for instance, if a normally open switch is used to replace a normally closed switch.

Figure 10: Single and Dual Input

A. Single input
B. Dual input

Table 3: Single or Dual Input, No Logic

Switch input	Wireless output	Switch input	Wireless output
CH1	**PV**	**CH2**	**SV**
Closed	TRUE (1.0)	Closed	TRUE (1.0)
Open	FALSE (0.0)	Open	FALSE (0.0)

Dual input, limit contact logic

When configured for Limit Contact Logic, the Rosemount 702 will accept the input from two single pole single throw switches on inputs CH1 and CH2, and will use limit contact logic for the determination of the wireless outputs.

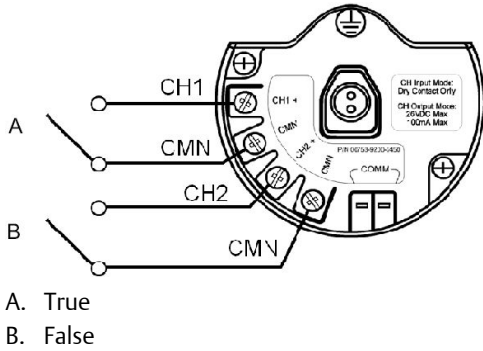**Figure 11: Dual Input, Limit Contacts**

A. True
B. False

Table 4: Dual Input, Limit Contact Logic

Switch inputs		Wireless outputs	
CH1	CH2	PV	SV
Open	Open	TRAVEL (0.5)	TRAVEL (0.5)
Open	Closed	FALSE (0.0)	FALSE (0.0)
Closed	Open	TRUE (1.0)	TRUE (1.0)
Closed	Closed	FAULT (NaN)	FAULT (NaN)

Dual input, opposing contact logic

When configured for opposing contact logic, the Rosemount 702 will accept the input from a double pole single throw switch on inputs CH1 and CH2, and will use opposing contact logic for the determination of the wireless outputs.

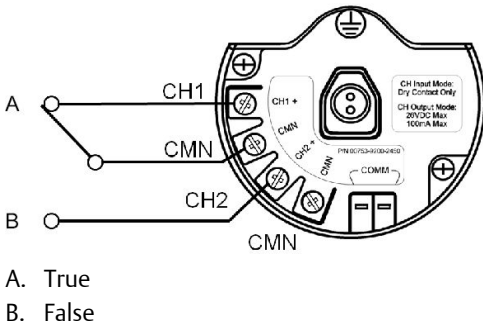**Figure 12: Dual Input, Opposing Contact**

A. True
B. False

Table 5: Dual Input, Opposing Contact Logic

Switch inputs		Wireless outputs	
CH1	CH2	PV	SV
Open	Open	FAULT (NaN)	FAULT (NaN)
Open	Closed	FALSE (0.0)	FALSE (0.0)
Closed	Open	TRUE (1.0)	TRUE (1.0)
Closed	Closed	FAULT (NaN)	FAULT (NaN)

## Momentary discrete inputs, measurement option code 32 and 42

The Rosemount 702 is capable of detecting momentary discrete inputs of 10 millisecond or more in duration, regardless of the wireless update rate. At each wireless update, the device reports current discrete state along with an accumulating count of close-open cycles for each input channel.

Figure 13: Momentary Inputs and Accumulating Count

D	B	C	B	C
E	0	1	4	5
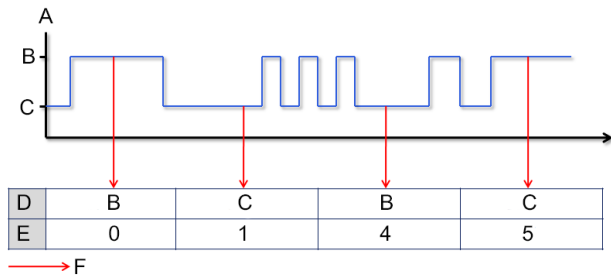
A. Input switch state
B. Closed
C. Open
D. State
E. Count
F. Wireless updates

Figure 14: Reporting of Current Discrete State and Count in AMS Device Manager
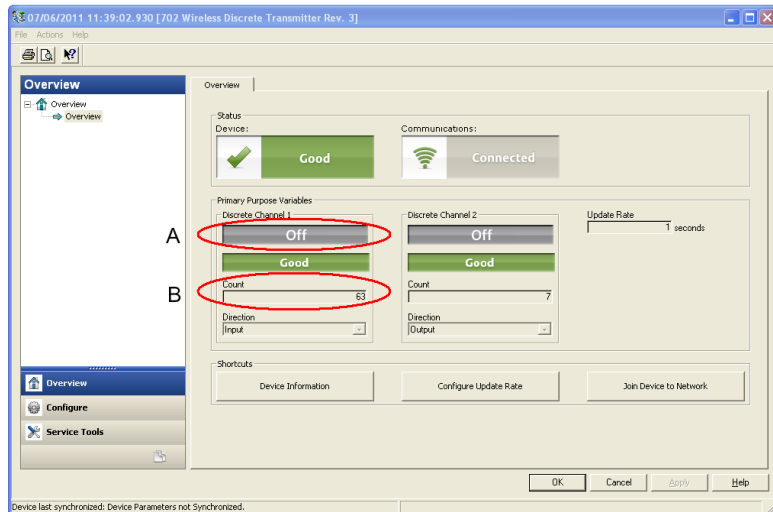
A. Current state
B. Count

Variable reporting and mapping

The Rosemount 702 will report variables exactly like the previous version of the device (measurement option code 22). In the Enhanced variable reporting mode, the transmitter will provide both current state of the discrete channels, and a count of the discrete state change cycles. Following is a table that shows the variable mapping for both cases. Variable Reporting can be set in AMS Device Manager by going to Configure > Manual Setup > HART.

Table 6: Variable Mapping

Variable reporting	Variable mapping			
	PV	**SV**	**TV**	**QV**
Enhanced – Discrete state with count	CH1 state	CH2 state	CH1 count	CH2 count

Discrete output circuits, measurement option Code 42

The Rosemount 702 has two channels that can each be configured for discrete input or output. Inputs must be dry contact switch inputs and these were described in a preceding section of this document. Outputs are a simple switch closure to activate an output circuit. The transmitter output does not provide any voltage or current, the output circuit must have power of its own. The transmitter output has maximum switch capacity per channel of 26 volts DC and 100 milliamps. A typical power supply for powering an output circuit can be 24 volts or lower.

Note

It is very important that the polarity of the output circuit is as shown in the wiring diagrams, with the positive (+) side of the circuit wired to the CH1+ or the CH2 + terminal, and the negative (-) side of the circuit wired to the CMN terminal. If the output circuit is wired backwards, it will remain active (switch closed) regardless of the state of the output channel.

Discrete output switch functionality

The discrete output of the Rosemount 702 is driven by the host control system, through the Gateway, and out to the transmitter. The time required for this wireless communication from the Gateway to the transmitter is dependent on many factors, including the size and topology of the network and the total amount of downstream traffic on the wireless network. For a network that is constructed to our best practices, typical delays in communication of a discrete output from the Gateway to the Transmitter are 15 seconds or less. Remember that this delay is only part of the latency that well be observed in a control loop.
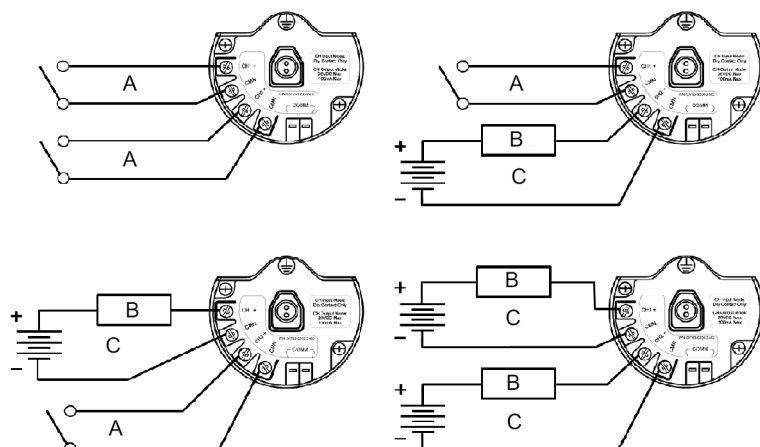
Note

The output switch functionality of the Rosemount 702 requires that the network is managed by a version 3 Gateway with v3.9.7 firmware, or a version 4 Gateway with v4.3 or higher firmware installed.

Figure 15: Output Circuit Wiring
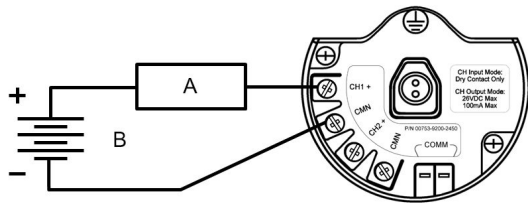
A. Load
B. Output

**Figure 16: Possible Configurations for Both Channel 1 and Channel 2**

A. Input
B. Load
C. Output

Special considerations for dual output circuits

If both channels are connected to output circuits, it is very important that the CMN terminal of each circuit be at the same voltage. Employing a common ground for both output circuits is one way to ensure that both circuits have CMN terminals at the same voltage.

Figure 17: Dual Output Circuits with a Common Ground
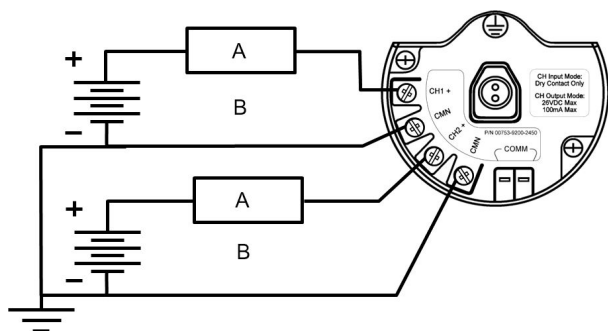
A. Load
B. Output

If two output circuits are connected to a single Rosemount 702 Transmitter with a single power supply, both CH + and CMN terminals must be connected to each output circuit. The negative power supply wires must be at the same voltage and connected to both CMN terminals.

**Figure 18: Dual Output Circuits with One Power Supply**
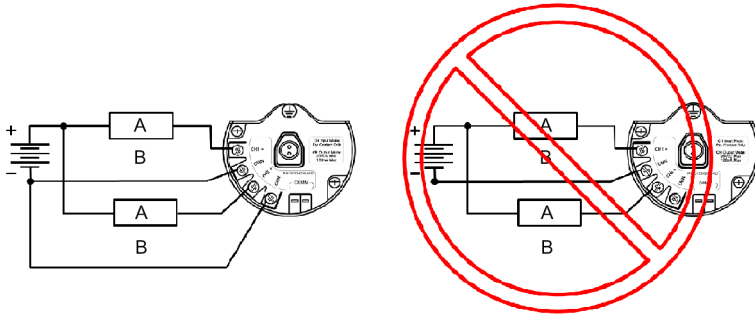
A. Load
B. Output

Switching greater currents or voltages

It is important to note that the maximum output switching capacity is 26 volts DC and 100 milliamps. If a greater voltage or current is to be switched, an interposing relay circuit can be used. Below is an example of a circuit to switch higher currents or voltages.

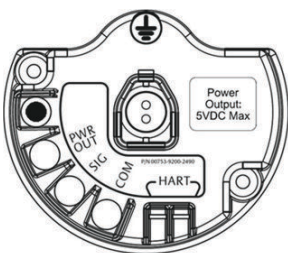**Figure 19: Wiring an Interposing Relay to Switch Greater Currents or Voltages**
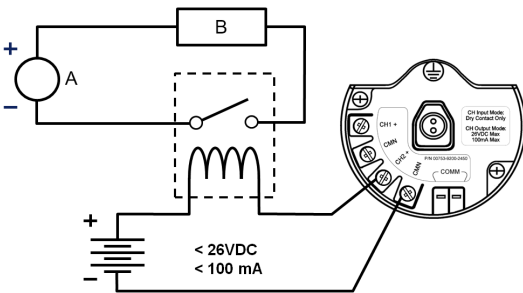
A. Power supply
B. Load

Plunger arrival detection

Terminal block connections

The plunger arrival detection configuration for measurement option code 52 is intended for use with the ETC Cyclops Plunger Arrival Sensor.

Figure 20: Plunger Arrival Terminal Diagram

The wiring connections to the ETC Cyclops sensor are made according to Figure 5-13, where 1 connects to 3, 2 connects to 2, and 3 connects to 1 between the transmitter and the sensor.

Figure 21: Wiring Configuration

Plunger Arrival Sensor   ETC Cyclops Sensor

Rosemount 702 Transmitter

1. PWR OUT
2. SIG
3. COM

ETC Cyclops Sensor

1. COM
2. SIG
3. PWR

For mounting and maintenance of the ETC Cyclops Sensor, refer to the ETC Cyclops Plunger Arrival Sensor *Manual*.

Latching feature

The Rosemount 702 has a latching feature that, when enabled, allows detection of momentary state changes to be held for a configurable latch period. The latching feature can be configured to detect either high or low state changes. By default, the Plunger state (channel 1) is enabled to latch high state changes for a period of one minute.
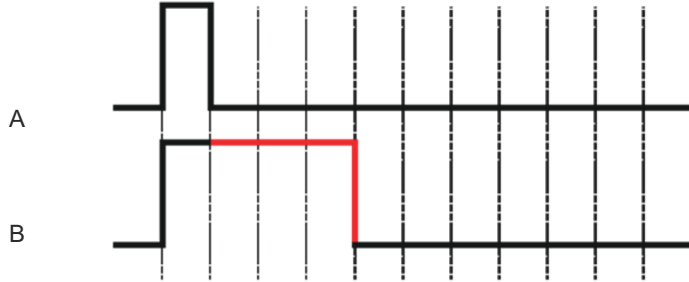
The following are some examples to demonstrate how the latching time works.

Note
Hold time is set to four seconds for illustration in the following examples.

Short events (less than latch hold time) of the measured value will be latched to the reported value for the duration of latch hold time.
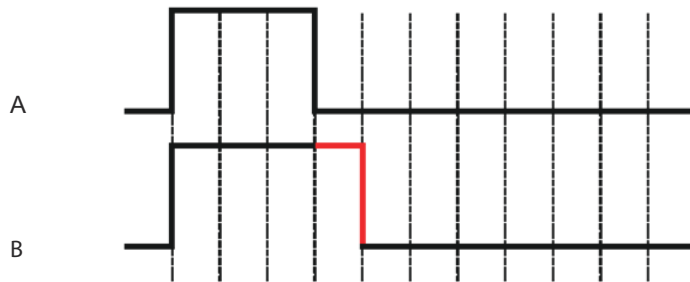
Figure 22: Latch Time Short Events

A. Measured
B. Reported

The start of the ltach hold timer begins when the measured signal first transitions to active state.

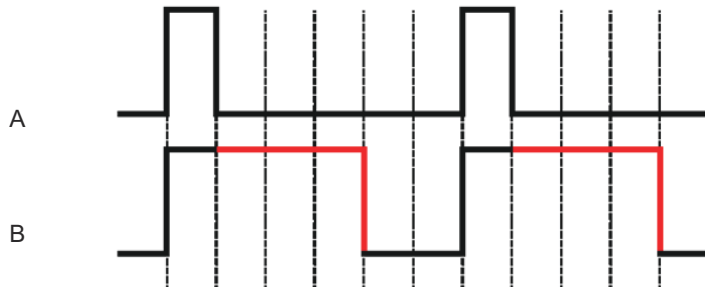**Figure 23: Latch Hold Time Start**

A. Measured
B. Reported

The latch only applies to transitions into the active state. As soon as the reported value is no longer latched,the devices is armed for the next event.

Figure 24: Latch Applies to Transitions to Active State

A. Measured
B. Reported

If the measured value goes inactive and active again before the initial latch hold timer experies, the latch hold timer will restart from the beginning of the most recent event.

Figure 25: Latch Hold Timer Restarts
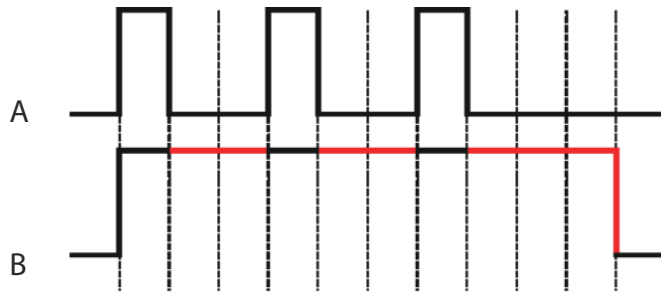
A. Measured
B. Reported

Leak sensors, liquid hydrocarbon detection, measurement option code 61

Terminal block connections

The liquid hydrocarbon detection configuration is intended for use with the Pentair™ or TraceTek® sensing cable.

- The Rosemount 702 can support up to 500 ft of TraceTek hydrocarbon or solvent sensor cable (TT5000 or TT5001 series). The total amount of sensor cable connected to a single transmitter is not to exceed 500 ft. However, leader cable, jumper cables (if used), and branch connectors are not included in the 500 ft (150 m) limit. See *Safety shower and eye wash monitoring* for typical configurations.

Product certifications

European directive information

A copy of the EU Declaration of Conformity can be found at the end of the Quick Start Guide. The most recent revision of the EU Declaration of Conformity can be found at *Emerson.com/Rosemount*.

Telecommunication compliance

All wireless devices require certification to ensure that they adhere to regulations regarding the use of the RF spectrum. Nearly every country requires this type of product certification. Emerson is working with governmental agencies around the world to supply fully compliant products and remove the risk of violating country directives or laws governing wireless device usage.

FCC and IC

This device complies with Part 15 of the FCC Rules. Operation is subject to the following conditions: This device may not cause harmful interference. This device must accept any interference received, including interference that may cause undesired operation. This device must be installed to ensure a minimum antenna separation distance of 20 cm from all persons.

Ordinary location certification

As standard, the transmitter has been examined and tested to determine that the design meets the basic electrical, mechanical, and fire protection requirements by a nationally recognized test laboratory (NRTL) as accredited by the Federal Occupational Safety and Health Administration (OSHA).

Installing equipment in North America

The US National Electrical Code® (NEC) and the Canadian Electrical Code (CEC) permit the use of Division marked equipment in Zones and Zone marked equipment in Divisions. The markings must be suitable for the area classification, gas, and temperature class. This information is clearly defined in the respective codes.

USA

I5 U.S.A. Intrinsically Safe (IS) and Non-incendive

Certificate: [CSA] 1143113

Standards: Class 3600 - 2011,Class 3610 - 2010, Class 3611 - 2004,Class 3810 - 2005, UL 50E (11th Edition), UL 61010-1 (3rd Edition), ANSI/ISA-60079-0 (12.00.01) - 2013, ANSI/ISA 60079-11 (12.02.01): 2014, ANSI/IEC 60529-2004

Markings: IS CL I, DIV 1, GP, A, B, C, D; CL II, DIV 1, GP E, F, G; Class III; Class 1, Zone 0 AEx ia IIC Ga T4; NI CL I, DIV 2, GP A, B, C, D T4; T4($-50\,°C \leq T_a \leq +70\,°C$) when installed per Rosemount drawing 00702-1020; Type 4X/IP66/67

Special Conditions for Safe Use (X):

1. The Rosemount 702 Transmitter housing contains aluminum and is considered a potential risk of ignition by impact or friction. Care must be taken into account during installation and use to prevent impact and friction.

2. The surface resistivity of the polymeric antenna is greater than 1GΩ. To avoid electrostatic charge build-up, it must not be rubbed or cleaned with solvents or a dry cloth.

3. The model 702 may only be used with either the 701PBKKF Rosemount Smartpower Black Power Module or the Computational Systems, Inc. (CSI) MHM-89004.

Sensor terminal parameters (option code 32)	Fuel sensor terminal parameters (option code 61)
U_O = 6.6 V	U_O = 7.8 V
I_O = 13.37 mA	I_O = 92 mA
P_O = 21.77 mW	P_O = 180 mW
C_O = 21.78 μF	C_O = 9.2 μF
L_O = 198 mH	L_O = 4.2 mH

N5 U.S.A. Nonincendive

Certificate: [CSA] 1143113

Standards: Class 3600 - 2011, Class 3611 - 2004, Class 3810 - 2005, UL 50E (11th Edition), UL 61010-1 (3rd Edition), ANSI/IEC 60529-2004

Markings: NI CL I, DIV 2, GP A, B, C, D T4; T4(-50 °C ≤ T_a ≤ +70 °C) Type 4X/IP66/67

Special Conditions for Safe Use (X):

1. The model 702 may only be used with either the 701PBKKF Rosemount Smartpower Black Power Module or the Computational Systems, Inc. (CSI) MHM-89004.

Canada

I6 Canada Intrinsically Safe

Certificate: [CSA] 1143113

Standards: CAN/CSA C22.2 No. 0-10, CSA Std. C22.2 No. 94-M1991 (R2011), CAN/CSA Std C22.2 60079-0-11, CAN/CSA 60079-11-14, CSA Std C22.2 No. 60529:05, CAN/CSA-C22.2 No. 61010-1-12

Markings: Intrinsically Safe Class I, Division 1; Groups A, B, C, and D, T4; suitable for Class 1, Zone 0, IIC, T4; when connected per Rosemount drawing 00702-1020; Type 4X

Special Conditions for Safe Use (X):

1. The Rosemount 702 Transmitter housing contains aluminum and is considered a potential risk of ignition by impact or friction. Care must be taken into account during installation and use to prevent impact and friction.

2. The surface resistivity of the polymeric antenna is greater than 1GΩ. To avoid electrostatic charge build-up, it must not be rubbed or cleaned with solvents or a dry cloth.

3. The model 702 may only be used with either the 701PBKKF Rosemount Smartpower Black Power Module or the Computational Systems, Inc. (CSI) MHM-89004.

N6 Canada Class I Division 2

Certificate: [CSA] 1143113

Standards: CAN/CSA C22.2 No. 0-10, CAN/CSA C22.2 No. 94-M91, CSA C22.2 No. 213-M1987, CSA Std C22.2 No. 60529:05

Markings: Suitable for Class 1, Division 2, Groups A, B, C, and D, T4; Cl. I, Zone 2, IIC, T4

Special Condition for Safe Use (X):

1. The model 702 may only be used with either the 701PBKKF Rosemount Smartpower Black Power Module or the Computational Systems, Inc. (CSI) MHM-89004.

Europe

I1 ATEX Intrinsic Safety

Certificate: Baseefa07ATEX0239X

Standards: IEC 60079-0: 2011, IEC 60079-11: 2012

Markings: ⟨Ex⟩
II 1 G Ex ia IIC T4 Ga, T4(-60 °C ≤ T_a ≤ +70 °C) Ex ia IIC T4 Ga, T4(-60 °C ≤ T_a ≤ +40 °C)

For use with Rosemount SmartPower power module part number 753-9220-0001, or for use with Emerson SmartPower option 701PBKKF.

Sensor terminal parameters (option code 32)	Fuel sensor terminal parameters (option code 61)
U_O = 6.51 V	U_O = 7.8 V
I_O = 13.37 mA	I_O = 92 mA
P_O = 21.76 mW	P_O = 180 mW
C_i = 0.216 µF	C_i = 10 nF
$C_{O\ IIC}$ = 21.78 µF	$C_{O\ IIC}$ = 9.2 µF
$C_{O\ IIB}$ = 549.78 µF	$C_{O\ IIB}$ = 129 µF
$C_O IIA$ = 1000 µF	$C_{O\ IIA}$ = 1000 µF
L_i = 0	L_i = 0
$L_{O\ IIC}$ = 200 mH	$L_{O\ IIC}$ = 4.2 mH
$L_{O\ IIB}$ = 800 mH	$L_{O\ IIB}$ = 16.8 mH
$L_{O\ IIA}$ = 1000 mH	$L_{O\ IIA}$ = 33.6 mH

Special Conditions for Safe Use (X):

1. The surface resistivity of the antenna is greater than 1 GΩ. To avoid electrostatic charge build-up, it must not be rubbed or cleaned with solvents or a dry cloth.

IU ATEX Intrinsic Safety for Zone 2

Certificate: Baseefa12ATEX0122X

Standards: IEC 60079-0: 2011, IEC 60079-11: 2012

Markings: ⟨Ex⟩
II 1 G Ex ia IIC T4 Ga, T4(-60 °C ≤ T_a ≤ +70 °C)

Ex ia IIC T5 Gc, T5(-60 °C ≤ T_a ≤ +40 °C)

Sensor terminal parameters (input)	Switch terminal parameters (output)
UO = 6.6 V	Ui = 26 V
IO = 13.4 mA	Ii = 100 mA
PO = 21.8 mW	Pi = 0.65 W
CO = 10.9 μF	N/A
LO = 25 μH	N/A

Special Conditions for Safe Use (X):

1. The surface resistivity of the antenna is greater than 1 GΩ. To avoid electrostatic charge build-up, it must not be rubbed or cleaned with solvents or dry cloth.

2. The Rosemount 701PB Power Module may be replaced in a hazardous area. The power module has surface resistivity greater than 1 GΩ and must be properly installed in the wireless device enclosure. Care must be taken during transportation to and from the point of installation to prevent electrostatic charge build-up.

International

I7 IECEx Intrinsic Safety

Certificate: IECEx BAS 07.0082X

Standards: IEC 60079-0: 2011, IEC 60079-11: 2011

Markings: Ex ia IIC T4 Ga, T4(-40 °C ≤ T_a ≤ +70 °C); Ex ia IIC T5 Ga, T5(-40 °C ≤ T_a ≤ +40 °C)

Sensor terminal parameters (option code 32)	Fuel sensor terminal parameters (option code 61)
U_O = 6.51 V	U_O = 7.8 V
I_O = 13.37 mA	I_O = 92 mA
P_O = 21.76 mW	P_O = 180 mW
C_i = 0.216 μF	C_i = 10 nF
$C_{O\ IIC}$ = 21.78 μF	$C_{O\ IIC}$ = 9.2 μF
$C_{O\ IIB}$ = 549.78 μF	$C_{O\ IIB}$ = 129 μF
$C_{O\ IIA}$ = 1000 μF	$C_{O\ IIA}$ = 1000 μF
L_i = 0	L_i = 0
$L_{O\ IIC}$ = 200 mH	$L_{O\ IIC}$ = 4.2 mH
$L_{O\ IIB}$ = 800 mH	$L_{O\ IIB}$ = 16.8 mH
$L_{O\ IIA}$ = 1000 mH	$L_{O\ IIA}$ = 33.6 mH

Special Conditions for Safe Use (X):

1. The surface resistivity of the antenna is greater than 1 GΩ. To avoid electrostatic charge build-up, it must not be rubbed or cleaned with solvents or dry cloth.

2. The Rosemount 701PBKKF Power Module may be replaced in a hazardous area. The power modules have a surface resistivity greater than 1GΩ and must be properly installed I the wireless device enclosure. Care must be taken during transportation to and from the point of installation to prevent electrostatic charge build-up.

3. The Rosemount 702 enclosure may be made of aluminum alloy and given a protective polyurethane paint finish; however, care should be taken to protect it from impact or abrasion if located in a Zone 0 area.

IY IECEx Intrinsic Safety for Zone 2

Certificate:	IECEx BAS 12.0082X
Standards:	IEC 60079-0: 2011, IEC 60079-11: 2011
Markings:	Ex nA IIC T4 Gc, T4(-40 °C ≤ T_a ≤ +70 °C); Ex nA IIC T5 Gc, T5(-40 °C ≤ T_a ≤ +40 °C)

Sensor terminal parameters (input)	Switch terminal parameters (output)
U_O = 6.6 V	U_i = 26 V
I_O = 13.4 mA	I_i = 100 mA
P_O = 21.8 mW	P_i = 0.65 W
C_O = 10.9 µF	N/A
L_O = 25 µH	N/A

Special Conditions for Safe Use (X):

1. The surface resistivity of the antenna is greater than 1 GΩ. To avoid electrostatic charge build-up, it must not be rubbed or cleaned with solvents or dry cloth.

2. The Rosemount 701PBKKF Power Module may be replaced in a hazardous area. The power modules have a surface resistivity greater than 1 GΩ and must be properly installed I the wireless device enclosure. Care must be taken during transportation to and from the point of installation to prevent electrostatic charge build-up.

3. The Rosemount 702 enclosure may be made of aluminum alloy and given a protective polyurethane paint finish; however, care should be taken to protect it from impact or abrasion if located in a Zone 0 area.

China

I3 China Intrinsic Safety

Certificate:	GYJ13.1238X
Standards:	GB3836.1-2010, GB3836.4-2010, GB3836.20-2010
Markings:	(option 32, 61): Ex ia IIC T4/T5 Ga, T4(-60 ≤ T_a ≤ 70 °C)/T5(-60 ≤ T_a ≤ 40 °C)
	(option 32, 42): Ex ic IIC T4/T5 Gc, T4(-60 ≤ T_a ≤ 70 °C)/T5(-60 ≤ T_a ≤ 40 °C)

Sensor terminal parameters (option code 32)	Terminal parameters (option code 42)		Fuel sensor terminal parameters (option code 61)
	Sensor	Switch	
U_O = 6.6 V	U_O = 6.6 V	U_i = 26 V	U_O = 7.8 V
I_O = 13.4 mA	I_O = 13.4 mA	I_i = 100 mA	I_O = 92 mA
P_O = 21.8 mW	P_O = 21.8 mW	P_i = 650 mW	P_O = 180 mW
$C_{O\ IIC}$ = 21.78 µF	C_O = 10.9 µF	N/A	C_O = 9.29 µF
$C_{O\ IIB}$ = 499.78 µF	N/A	N/A	N/A
$C_{O\ IIA}$ = 1000 µF	N/A	N/A	N/A

Sensor terminal parameters (option code 32)	Terminal parameters (option code 42)		Fuel sensor terminal parameters (option code 61)
	Sensor	Switch	
$L_{O\ IIC}$ = 200 mH	L_O = 0.025 mH	N/A	L_O = 2 mH
$L_{O\ IIB}$ = 800 mH	N/A	N/A	N/A
$L_{O\ IIA}$ = 1000 mH	N/A	N/A	N/A

Special Conditions for Safe Use (X):

1. See certificate for special conditions.

Japan

I4 TIIS Intrinsic Safety

Certificates:	TC20411 (Option 32), TC20412 (Option 61)
Markings:	Ex ia IIC T4 X (-20≤ T_a ≤ +60 °C)

EAC – Belarus, Kazakhstan, Russia

IM Technical Regulation Customs Union (EAC) Intrinsic Safety

Certificate:	RU C-US.Gb05.B.00578
Markings:	(option 32, 61): 0Ex ia IIC T4/T5 X, T4(-60 °C ≤ T_a ≤ +70 °C)/T5(-60 °C ≤ T_a ≤ +40 °C)
	(option 32, 42): 2Ex ic IIC T4/T5 X, T4(-60 °C ≤ T_a ≤ +70 °C)/T5(-60 °C ≤ T_a ≤ +40 °C)

Sensor terminal parameters (option code 32)	Terminal parameters (option code 42)		Fuel sensor terminal parameters (option code 61)
	Sensor	Switch	
U_O = 6.6 B	U_O = 6.6 B	U_i, B = 26 B	U_O = 7.8 B
IO = 13.4 MA	I_O = 13.4 MA	I_i, MA = 100 MA	I_O = 92 MA
PO = 21.8 MBT	P_O = 21.8 MBT	P_i, BT = 650 MBT	P_O = 180 MBT
C_i = 216 HФ	C_i = 216 HФ	N/A	C_i = 10 HФ
$C_{O\ IIC}$ = 23.78 мкФ	$C_{O\ IIC}$ = 23.78 мкФ	N/A	N/A
$C_{O\ IIB}$ = 549.78 мкФ	$C_{O\ IIB}$ = 549.78 мкФ	N/A	N/A
$C_{O\ IIA}$ = 1000 мкФ	COIIA = 1000 мкФ	N/A	N/A
L_i = 0	L_i = 0	L_i = 0	L_i = 0
$L_{O\ IIC}$ = 200 МГН	$L_{O\ IIC}$ = 200 МГН	N/A	N/A
$L_{O\ IIB}$ = 800 МГН	$L_{O\ IIB}$ = 800 МГН	N/A	N/A
$L_{O\ IIA}$ = 1000 МГН	$L_{O\ IIA}$ = 1000 МГН	N/A	N/A

Special Conditions for Safe Use (X):

1. See certificate for special conditions.

Combinations

KQ   Combination of I1, I5, and I6

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